3.4.3 Determination of Coverage (cont)

of a proposed system. These variables are (1) the required strength of the received signal, (2) antenna height above average terrain (HAAT), (3) the effective radiated power (ERP) of the system, and (4) the type of environment.

Received Signal Strength:

For purposes of this plan, received signal strength shall be the determining factor which defines the actual boundary of a system. The minimum signal level which marks the outer boundary of a system shall be 40 dBu.

Antenna Height:

Shall be the height of the antenna above the average terrain surrounding the tower site.

Effective Radiated Power (ERP):

The ERP is the transmitter output power times the net gain of the antenna system. The actual formula is: ERP (w) equals Power(w) times Antilog (net gain in dB divided by 10).

Environment Type:

OKUMURA/HATA METHOD: The Okumura method uses four different classifications to describe the average terrain around a transmitter site or area. The classifications are:

(1) URBAN: Which is built-up city-crowded with large buildings or closely interspersed with houses and thickly-grown trees. This would include the downtown area of a major city.

3.4.3 Determination of Coverage (cont)

(2) SUBURBAN: Which is a city of highway scattered with trees, houses and buildings. This would include the downtown area of a large city.

(3) QUASI-OPEN: Is an area between suburban and open areas. This includes areas outside of city limits that have few buildings and houses.

(4) OPEN: Is and area where there are no obstacles such as tall trees or buildings in the propagation path or a plot of land which is cleared of anything for 300 to 400 meters ahead. This would include farm land, open fields, etc.

The Okumura/Hata method is the method resident in the computer packing program to develop this plan. A minimum system shall be permitted without special consideration when it is limited to a HAAT of 100 feet and the transmitter is centrally located within the jurisdiction or jurisdictions participating in a system. In all jurisdictions, regardless of size, a maximum boundary radius of 8 miles shall be allowed provided adequate measures have been taken to assure that interference of existing co-channel and adjacent channel systems will not occur. Preparation of these requirements shall be the responsibility of the applicant. The Federal Communications Commission provides, in part 90.309(a)(4) of the Rules and Regulations, some additional guidance for these calculations.

3.4.4 Annexations And Other Expansions

It is well known that as cities grow, annexations occur. When an

3.4.4 Annexations And Other Expansions (cont)

expansion of the present city limits of any city currently using an 800 megahertz system within the spectrum as herein specified occurs, it is understood that the existing system may have to be expanded and its range increased. This is a modification and may be permitted. The increased range of the system will have to be determined at the time of modification to assure non-interference with any other existing system. Where interference is likely, the use of alternate methods of expansion, such as satellite systems, may be necessary.

Should the annexation or expansion of a city effectively take in all or most of a county, the allocation for that county may be given to the city if required by said city and not in use or planned to be used by the county. Where more spectrum is not available from the initial allocation, the rules for expansion of initial allocation, as contained in this plan, shall apply.

3.4.5 Coverage Area Description

All applicants shall provide with their applications a map showing the jurisdictional boundaries to be covered by the system, and the calculated system coverage. This map shall display the location of the system transmitter(s), including control stations. It is recommended that a U.S. Geological Survey (USGS) Quad topographical map be used for this purpose. If not available, a high quality locally produced map or a highway map may be substituted. Regardless of the type map used, the name of the applicant and the scale of the map shall be

3.4.5 Coverage Area Description (cont)

displayed on the map.

The following table lists the field strength in dBu/KW versus distance and antenna height for the suburban environment. The adjustment factors for the other environments relative to the suburban environment are:

Urban = Suburban - 9.7 dB,

Quasi-open = Suburban + 9.2 dB,

Open = Suburban + 18.4 dB

3.4.6 Give-Back Frequencies

All agencies participating in the use of the new 800 megahertz spectrum shall prepare and submit a plan for the abandonment of their currently licensed frequencies in the lower bands. These released frequencies shall be available for reassignment to those agencies not migrating to 800 MHz at this time.

3.4.6 Give-back Frequencies (cont)

coordination and application forms with the document of release. This will put the applicant in a better posture for reassignment of the frequency in question. It should be noted that even though this procedure is followed, there is no guarantee that a particular frequency will be assigned to the returning jurisdiction.

The time frame allowed for phasing into 800 MHz and out of the lower currently licensed bands will be considered on a case by case basis by the review committee. Generally, one year will be considered acceptable in most cases, with five years as a maximum. Any agency requiring more than five years shall provide documents stating the reasons for the delay, and give the estimated time of completion.

3.4.7 Unused Spectrum

Due to the fact that all of the frequency spectrum is not needed at this time, the excess channel pairs will be returned to a reserve pool. These channels may be used for conflict with adjacent Region allocations or may simply remain within this Region until needed. This does not imply that these frequencies are unavailable, only that before they can be utilized within the Region they must be coordinated via the regular APCO coordination process and within the guidelines set forth in this plan. Where possible, the channels designated for a jurisdiction in this plan shall be used.

3.4.8 Adjacent Region Coordinations

Coordination with adjacent regions shall be an on-going process until all region plans have been finalized. At present, all adjacent regions have been coordinated with and no conflicts have been identified. The adjacent regions with which coordination has been conducted are: Texas (Region 50); Texas (Region 52); Oklahoma (Region 34); Colorado (Region 07); Utah (Region 41); and Arizona (Region 03). (See attached letters)

As the use of the five National channels is not considered a day-to-day function, the "hard" coordination for the use of these channels is not considered to be necessary or advisable. The use of these channels will always be on a non-interference basis, with on-the-air coordination at the time of use when required. Any user found to be operating in any manner other than this shall be considered to be operating improperly and subject to the existing Federal Communications Commission rules for willful interference with the communications of other users.

3.5 INITIAL SPECTRUM ALLOCATION

3.5.1 Frequency Sorting Methodology

The initial spectrum allocation for the Region 29 was determined by a computerized frequency sorting process performed by APCO. The purpose of the computer program which assigns frequencies to specific eligibles and to pools for future assignments is two-fold

A) The assignments must result in a high degree of spectrum efficiency, and

B) The assignments must result in a low probability of

3.5.1 Frequency Sorting Methodology (cont)

co-channel and adjacent channel interference.

Since the desired output is a geographic sorting of frequencies, a method of defining geography must be part of the input. A list of the number of channels to be assigned in each geographic area is also required, along with the name of the eligible or pool. Acceptable interference probabilities are determined for the Region. Frequency assignments are then made using a computer program which satisfies the goals of spectrum efficiency and interference protection. The following narrative describes the factors and process used by the computer program.

3.5.2 Geographic Area

For the purpose of this frequency sort, a geographic area is defined as one or more circles of equal radius. To the degree practical, the circle(s) should include the entire area of the eligible's geopolitical boundary, but not exceed the boundary by more than three (3) miles. Thus, the procedure is to gather maps of sufficient detail, outline the areas to be defined, determine the coordinates and radius of the circles which define each area, and tabulate the data.

3.5.3 Define The Environment

The environment of each system is defined according to the Okumura/Hata method of classifications.

3.5.4 Blocked Channels

In the Region 29 there are five mutual aid channels which must be blocked out to prevent the computer from making assignments on

3.5.4 Blocked Channels (cont)

these channels. (Since the mutual aid channels are spaced at 0.5

3.5.6 Special Considerations (cont)

radios can only operate on "even" FCC numbered channels in the 821-824/866-869 MHz band. The computer program is able to take this into account when making assignments.

3.5.7 Protection Ratios

There are two interference protection ratios built into the computer program. One is for the co-channel case, the other is for the adjacent channel case. The ratios provide 35 dB Desired/Undesired signal ratio for co-channel assignments, and 15 dB Desired/Undesired ratio for the adjacent channel case. These ratios provide an acceptable probability of interference for Public Safety Services.

3.5.8 Adjacent Region Considerations

The computer program requires a listing of channels to be blocked along the borderline with other regions which have pre-existing plans. If the adjacent region plan was developed using the APCO packing program, this information exists in the database. If the adjacent region plan was developed by another method, then the data must be obtained from the adjacent region's plan in order to build the exclusion list.

4.0 COMMUNICATIONS REQUIREMENTS

4.1 Common Channel Implementation

The implementation of the International Common Channels must follow the guidelines as set forth by the Federal Communications Commission by the approval of the National Plan. These five common channels are accessible by all levels of government in US

4.1 Common Channel Implementation (cont)

and Mexico and shall be used in accordance with the provisions of the National Plan. All mobile and portable equipment must be equipped to operate in the "talk-around mode" when required on the International Channels.

The International calling channel (821/866.0125 MHz) shall be implemented as a full mobile relay. Wide area coverage transmitters will be installed where applicable within a system. Large system users (5 channels or more) of 800 MHz shall be required to monitor this channel at all times. The area of coverage for this channel shall be equal to the area covered by the licensed system. This may or may not require the use of satellite receivers within the area to meet this requirement.

The four International Tactical (ITAC) Channels will be assigned State-wide, for use as needed by all eligible licensees. These channels are to be used in accordance with the National Plan and in compliance with the regulations as set forth by the Federal Communications Commission. These channels require no special licensing, only that the users be eligible for licensing on the other Public Safety 800 MHz channels as specified in section 90.617 (a) of the FCC Rules and Regulations.

4.1.1 Areas of Operation

The common channels shall be available for use throughout the Region 29. One specific assignments were deemed necessary within the Region. State of New Mexico Control Center, Santa Fe, New Mexico state wide operation.

4.1.2 Operation on The Common Channels

Normally, the five national mutual-aid channels are to be used only for activities requiring inter-communications between agencies not sharing any other compatible communications system. National mutual-aid channels are not to be used by any level agency for routine, daily operations. In major emergency situations, one or more ITAC channels may be assigned by the primary Public Safety Agency within that area of operation. The primary Public Safety agency in each county, if not defined elsewhere in the plan, shall be the County Sheriff's Department or Public Safety Department or the lead agency, which may be any agency licensed to operate in this spectrum, or "on-scene" commander. The primary Public Safety agency shall be the city level Public Safety Department in situations which occur within the corporate limits of said city. These primary agencies will assign one or more of the ITAC channels for use according to need during each special situation requiring the use of these channels. Participants in the national mutual-aid channels include Federal, State, and Local Disaster Management agencies. Police, Fire, and

4.1.2 Operation on The Common Channels (cont)

Emergency Medical services (providers of Basic and Advanced Life support services) will be the primary using agencies. If radio channels are available, other services provided in the Public Safety Radio Services also participate to the extent required to insure the safety of the public. These agencies include the Highway Department, Forestry, Game & Fish Department, Parks and other special service agencies not normally involved in day-to-day public safety operations.

4.1.3 Operation Procedures

On all Common Channels, plain English will be used at all times in US (if approved, Spanish on the Mexican border) and the use of unfamiliar terms, phrases, or codes will not be allowed.

4.1.3(I) International Calling Channel (ICALL):

The ICALL channel shall be used to establish contact with other users in a particular Region that can render assistance at an incident. This channel shall not be utilized as an ongoing working channel. Once contact has been established between agencies, an agreed upon ITAC or mutual aid channel shall be used for continued communications.

4.1.3(II) International Tactical Channels (ITAC-1 - ITAC-4):

These frequencies are reserved for use by those agencies involved in inter-agency communications. Incidents requiring multi-agency participation will utilize these frequencies as directed by the control agency assuming responsibility for an incident or area of concern. These frequencies may be subdivided according to

4.1.3(II) International Tactical Channels (ITAC-1 - ITAC-4) (cont)

function in an incident or by geographical location in response to an incident. It is recommended that the following assignments for ITAC-1 through ITAC-4 be used when possible.

ITAC-1 .....Law Enforcement

ITAC-2 .....Fire Services

ITAC-3 .....Emergency Medical Services

ITAC-4 .....Command and Control

4.1.4 Coded Squelch

All equipment capable of operating on the five (5) common channels shall be equipped with the National Common Tone Squelch of 156.7 Hz. Mobile relays on these channels, if authorized, may use additional tone or digital squelch codes for the purpose of selecting individual mobile relay stations, provided the National Common Tone Squelch Code is used on the output. If such an arrangement is utilized, provision must also be made for certain centralized, high level sites to be activated by the 156.7 Hz tone to ensure emergency access by transient units.

4.2 Network Operating Methods

Communications systems using ITAC-1 thru ITAC-4 will be implemented by agencies who volunteer on a distributed coordinated basis.

Every primary geographic section of the Region is intended to be covered by at least one of the ITAC channels. In many areas the common channels will be utilized on a mobile to mobile talk-around basis. Mobile relays on ITAC-1 thru ITAC-4 will be

on a limited coverage design to permit reuse of the channel several times within the Region and in adjacent regions. Since Region 29 will probably not have a large number of stationary ITAC Channel stations, the implementation of mobile relay or repeaters is strongly encouraged. This will fill an "on-scene" requirement for most multi-agency response situations. Adjacent region coordination will be via existing mutual aid coordination procedures with the requesting region establishing the tactical frequency assignment.

The State of New Mexico Will use ICALL and ITAC-1, ITAC-2, ITAC-3 ITAC-4 for communications with all agencies, and with Mexico.

4.3 Requirements For Trunking

All systems operating in the Region having five or more channels will be required to be trunked. Those systems having four or less channels may be conventional. It is strongly suggested that any entity licensing three or more repeaters use trunking.

The FCC in its Report and Order states: "Exceptions will be permitted only when a substantial showing is made that alternative technology would be at least as efficient as trunking or that trunking would not meet operational requirements. Exceptions will not be granted routinely. Strong showings as to why trunking is unacceptable must be presented in support of any request for exception."

Systems that do not meet FCC loading standards can be required to share such frequencies on a non-exclusive basis. Those agencies

requesting Data channels only can be required to share channels with adjacent agencies wherever feasible or limit coverage to their geographic area. Exceptions will be considered on a case-by-case basis by the Regional Review Committee.

Depending on systems loading and the need for multiple systems within an area, operators of wide area systems (including, but not limited to, designated "Monitoring Agencies") must provide for coordination between area-wide systems and "Monitoring Agencies". Single municipalities or agencies must restrict design and implementation of their systems(s) to provide only the communications needed within its geopolitical boundaries. The use of trunked systems is encouraged. However, if the total number of radios in service does not reach minimum loading criteria for a trunked system, that user must consider utilizing the next higher system level if 800 MHz trunked radio is available in the area. As systems reach capacity, the smaller system users must consider consolidating their communications systems to formulate one large trunked system.

A requesting applicant for radio communications in the 800 MHz public safety services in the Region 29 will be required to conform to the FCC loading criteria for its proposed system. The provisions of this regional plan must be used as a guide for establishing any new systems. Strict adherence for limiting the area of coverage to the boundaries of the applicant agency's jurisdiction must be observed. Overlap or extended coverage must

4.3 Requirements For Trunking (cont)

be minimized, even where systems utilizing 800 MHz trunked radio systems are proposing to intermix systems for cooperative and/or mutual aid purposes.

Antenna heights are to be limited to provide only the necessary coverage for a system. When antenna locations are restricted to only the "high-ground", transmitter outputs and special antenna patterns must be employed to produce only the necessary coverage with the proper amount of ERP. All necessary precautions are to be taken to gain maximum reuse of the limited 800 MHz spectrum.

4.4 Channel Loading Requirements

NOTE: New Mexico Region 29 is a rural mountainous area with Counties and cities with sparse population. The smaller counties have the same right as the larger counties. Smaller counties have the same agencies to license, but they can't make the loading requirement for even a one channel system.

In region 29, each licensee will be considered on a case-by-case basis by the Review committee.

An agency/jurisdiction requesting a single frequency to replace a frequency currently in use that will be turned back for reassignment will not be required to meet loading requirements in order to obtain the new frequency. However, if the single frequency is not loaded to more than 50 units within three years after the license is granted, the frequency will be available for assignment to other agencies on a shared basis in the event that other frequencies meeting the criteria for assignment are

4.4 Channel Loading Requirements (cont)

exhausted. Shared use of a frequency is not interference free. Users of single frequency systems may be required to provide the Regional Review Committee "confirmation of loading" for mobiles and portables as a method of validating system loading. This exception shall apply to agencies having only one system and a single frequency. Agencies/jurisdictions requesting multiple frequencies or employing trunking technology shall comply with

4.4.2 Traffic Loading Study

additional frequencies. Justification for adding frequencies, or retaining existing frequencies, can be provided by a traffic loading study in lieu of loading by number of transmitters per channel. It will be the responsibility of the requesting agency to provide a verifiable study showing sufficient air-time usage to merit additional frequencies. A showing of air-time usage, excluding telephone interconnect air time, during the peak busy hour greater than 70 percent per channel on three consecutive days will be required to satisfy loading criteria.

4.4.3 Slow Growth

All systems in the 821-824/866-869 mHz band under slow growth will be in accordance with 90.629 of the FCC Rules.

4.5 Use of Long Range Communications

During incidents of major proportions, where Public Safety requirements might include the need for long-range communications in and out of a disaster area, alternate radio communications plans are to be addressed by Primary Public Safety agencies within this sub-region. These agencies should integrate the appropriate interface to the long distance communications providers. Such long distance radio communications might be Amateur radio operations, Satellite communications and/or long range Emergency Preparedness communications systems, any of or all of which should be incorporated as part of the communications plans of those lead agencies. They then could provide the means to communicate outside the area for themselves and the smaller

4.5 Use of Long Range Communications (cont)

agencies who might need assistance. Instances as addressed in the National Public Safety Planning Advisory Committee's Plan, such as earthquakes, hurricanes, floods, widespread forest fires, or nuclear reactor problems could be a cause for such long-range communications needs.

4.6 Expansion of Existing Systems

Existing systems that are to be expanded to include the frequency bands of 821-824/866-869 mHz will have the mobile radios "grandfathered", provided that they are modified in conformance

5.1 Notification (Cont)

Supplemental to the personal contact, an advertisement was placed in the FCC PUBLIC NOTICE. All APCO Chapter members and a large number of other interested parties who had requested notification were sent letters of invitation.

During the initial meeting, names, addresses and telephone numbers of those individuals present who wished to either participate in the planning process, or who wanted to be kept informed on the progress of the planning effort were taken. These individuals or agencies were sent all announcements for meetings and bulletins of progress.

When the work on the draft plan was completed, each member of the planning committee was presented with a draft copy of the plan for study. A planning committee meeting was called to vote on the final draft. A copy of the final draft was mailed to each member of the committee not present at the meeting. Each plan contained a ballot for voting on the acceptance of the plan.

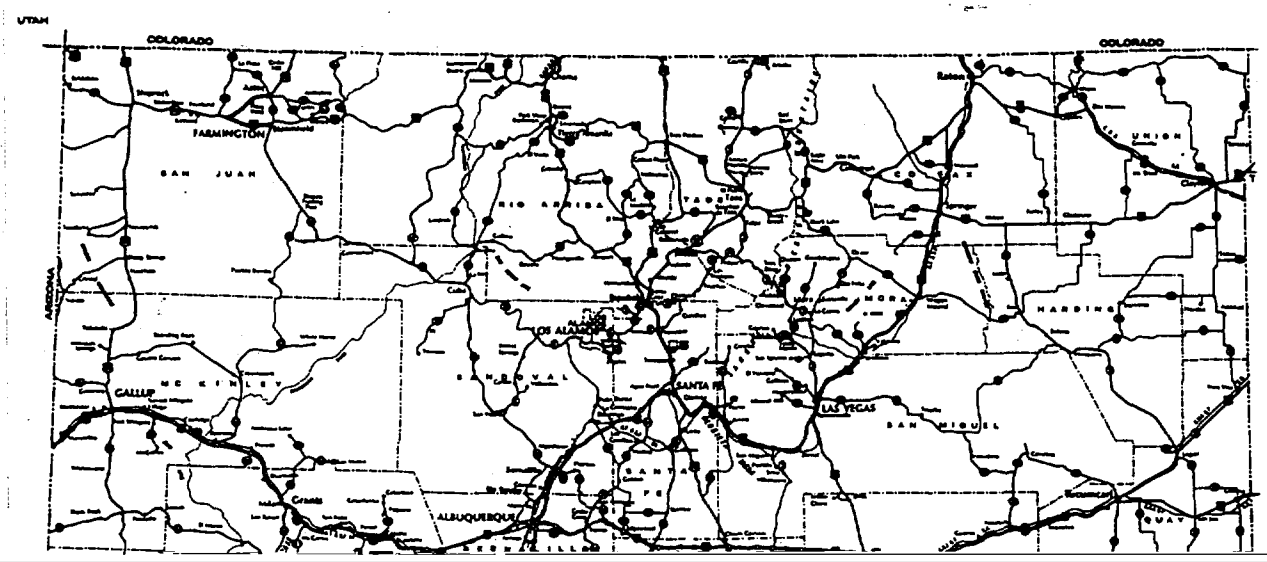
5.2 Frequency Allocation Process

The method used for "packing" Region 29 was the APCO computerized method. The approximate geographical location for the center of each county, in latitude and longitude, were provided along with the environmental type of the county and the approximate radius to cover the county lines. Along with this information, a list of frequencies to block along the adjacent region's border was included. The actual assignment of frequencies is for four (4) channel-pairs per county.
This allocation is the minimum and only applies to counties with a population of 10,000 or less. One additional channel is allocated for each additional 10,000 of population. The state of New Mexico has reserved 15 channels State-wide. This leaves a reserve pool of channels for future assignment.

5.3 Frequency Allocation Map

Below is the data, or packing plan generated by APCO via the computerized packing program. The first section is county by county information provided, followed by the packing plan. The plan took adjacent regions into consideration, in addition, letters of concurrence were sent.

5.4 State Map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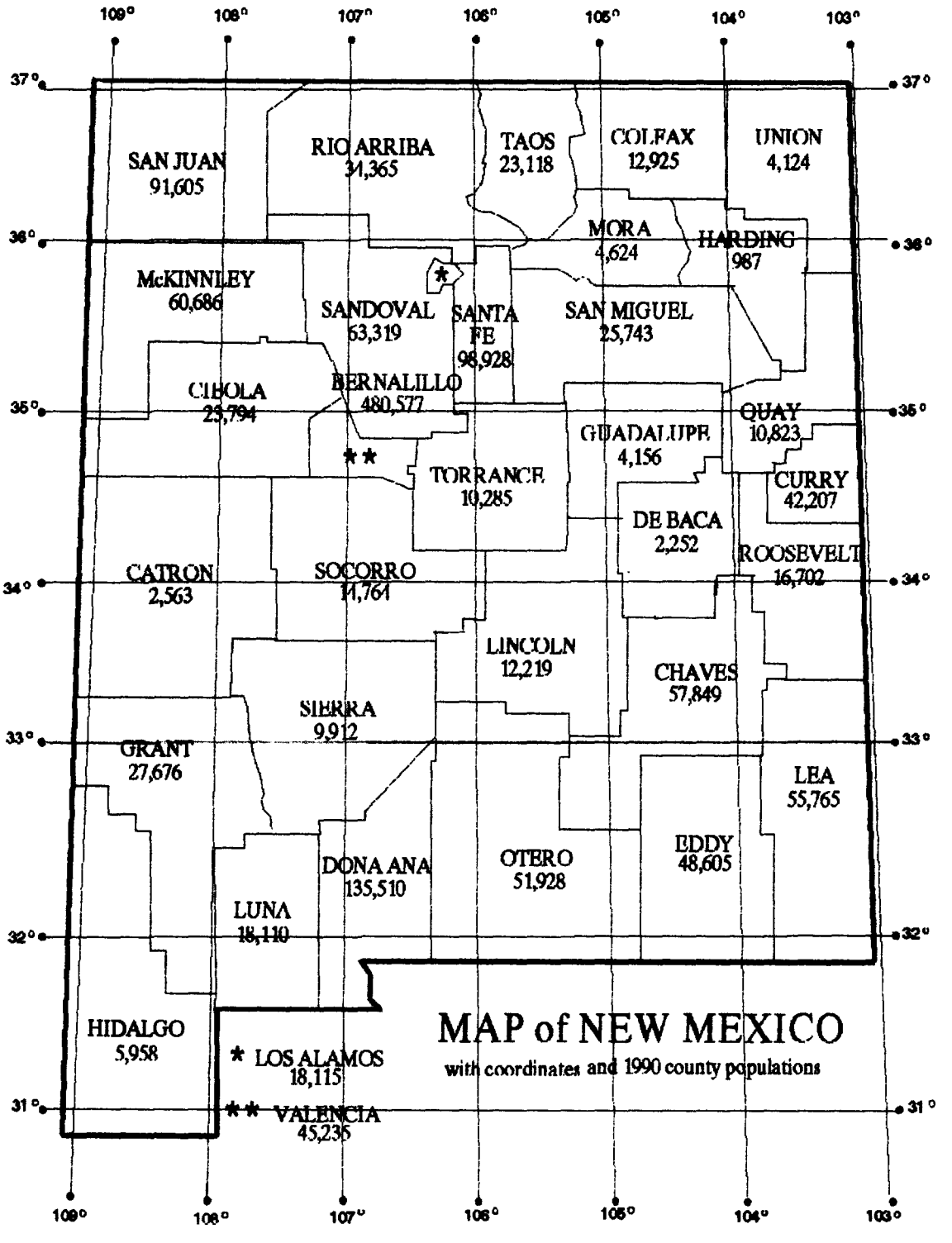
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60,686
SANDOVAL
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SANTA FE
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SAN MIGUEL
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CIBOLA
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BERNALILLO
480,577
QUAY
10,823
GUADALUPE
4,156
TORRANCE
10,285
CURRY
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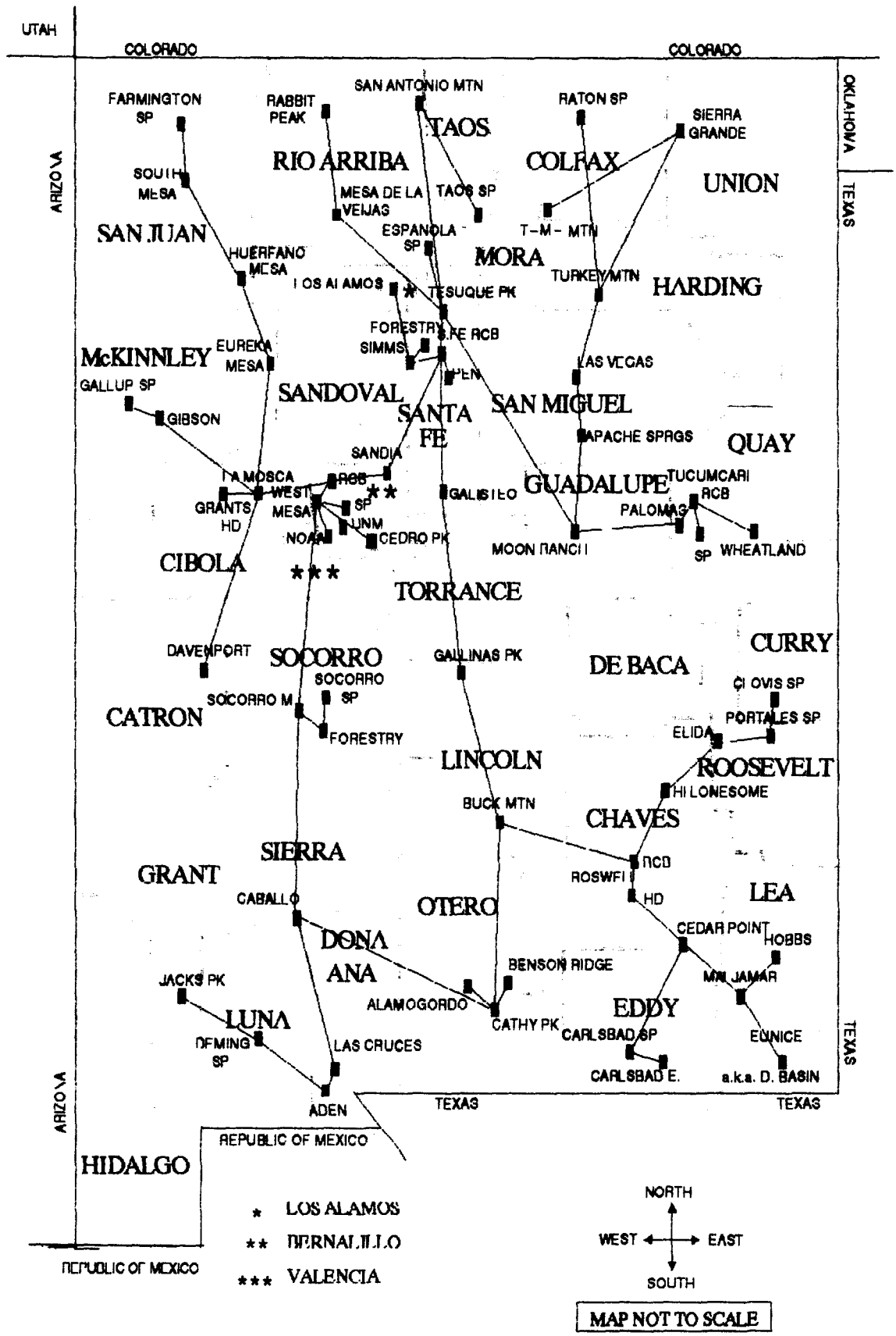
DE BACA
2,252
ROOSEVELT
16,702
CATRON
2,563
SOCORRO
11,761
LINCOLN
12,219
CHAVES
57,849
SIERRA
9,912
GRANT
27,676
LEA
55,765
EDDY
48,605
DONA ANA
135,510
OTERO
51,928
LUNA
18,110
HIDALGO
5,958
* LOS ALAMOS
18,115
** VALENCIA
45,235
MAP of NEW MEXICO
with coordinates and 1990 county populations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RIO ARRIBA
COLFAX
UNION
SOUTH MESA
MESA DE LA VEIJAS
TAOS SP
T-M - MTN
SAN JUAN
ESPANOLA SP
MORA
HUERFANO MESA
TURKEY MTN
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TESUQUE PK
FORESTRY
S.FE RCB
SIMMS
McKINNLEY
EUREKA MESA
LAS VEGAS
GALLUP SP
SANDOVAL
SANTA FE
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GALISTEO
RCB
GRANTS
MESA
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CEDRO PK
MOON RANCH
SP
WHEATLAND
CIBOLA
TORRANCE
DAVENPORT
SOCORRO
GALLINAS PK
DE BACA
CURRY
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CLOVIS SP
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CATRON
PORTALES SP
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ROSWELL
HD
LEA
CABALLO
OTERO
CEDAR POINT
HOBBS
DONA ANA
BENSON RIDGE
JACKS PK
MILJAMAR
ALAMOGORDO
EDDY
LUNA
CATHY PK
CARLSBAD SP
EUNICE
DEMING SP
LAS CRUCES
CARLSBAD E.
a.k.a. D. BASIN
ADEN
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TEXAS
ARIZONA
REPUBLIC OF MEXICO
HIDALGO
REPUBLIC OF MEXICO
* LOS ALAMOS
** BERNALILLO
*** VALENCIA
NORTH
WEST
EAST
SOUTH
MAP NOT TO SCALE

5.5 Common Channel Numbers to Exclude from New Mexico

601	821.0125/866.0125	Mutual Aid (ICALL)
602	821.0375/866.0375	Reserved
603	821.0500/866.0600	Reserved for protection
639	821.5125/866.5125	Mutual Aid (ITAC-1
640	821.5375/866.5375	Reserved for Future
641	821.5500/866.5500	Reserved for Protection
677	822.0125/867.0125	Mutual Aid (ITAC-2)
678	822.0375/867.0375	Reserved For Future Use
679	822.0500/867.0500	Reserved For Protection
715	822.5125/867.5125	Mutual Aid (ITAC-3)
716	822.5375/867.5375	Reserved For Future
717	822.5500/867.5500	Reserved For Protection
753	823.0125/868.0125	Mutual Aid (ITAC-4)
754	823.0375/868.0375	Reserved for Future
755	823.0500/868.0500	Reserved for Protection